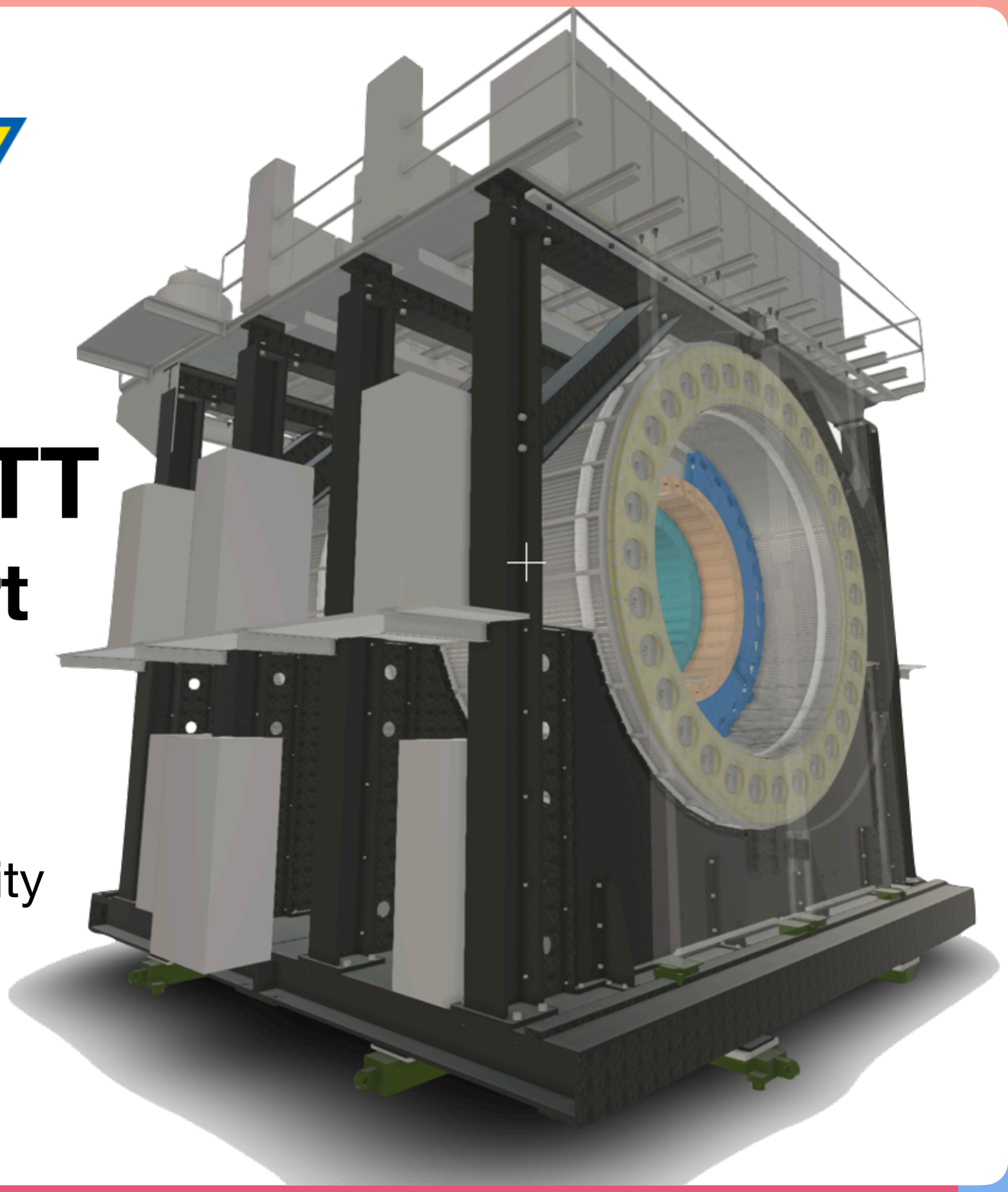
sPHENIX INTT - Weekly Report

Cheng-Wei Shih,
Chia-Ming Kuo

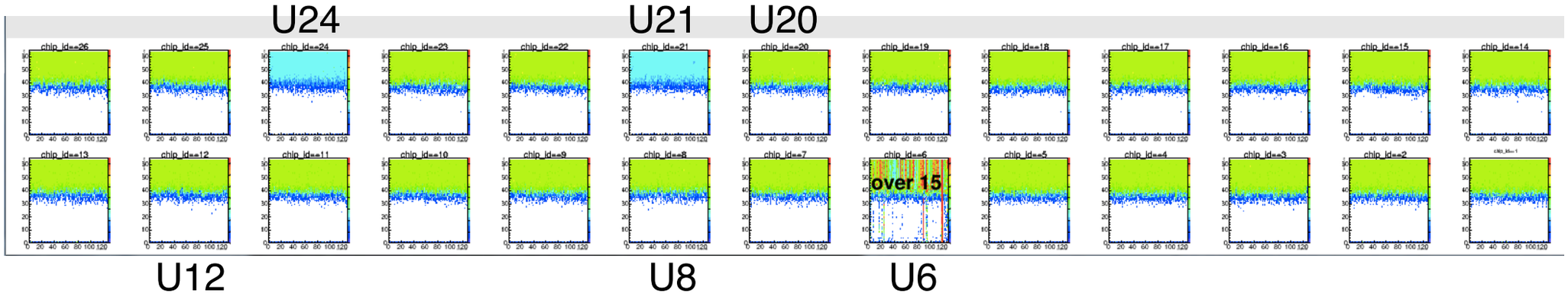
National Central University

2021/7/28



Cosmic test with BEC

Calibration test right before the cosmic test.



Bus Extender Cable (BEC)

Number of hits of each chip

U1	35	U14	51
U2	53	U15	49
U3	72	U16	201
U4	126	U17	186
U5	265	U18	374
U6	609	U19	442
U7	2631	U20	1299
U8	1772	U21	3412
U9	4853	U22	3964
U10	4939	U23	4666
U11	5887	U24	5291
U12	3256	U25	6162
U13	6984	U26	7086

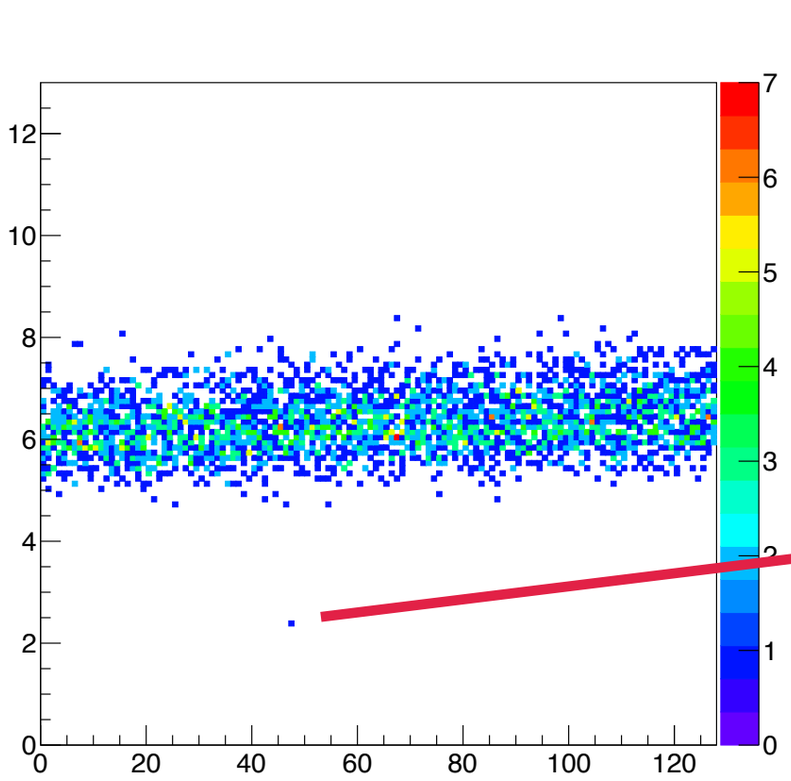
Some chips seems to hav only half of events

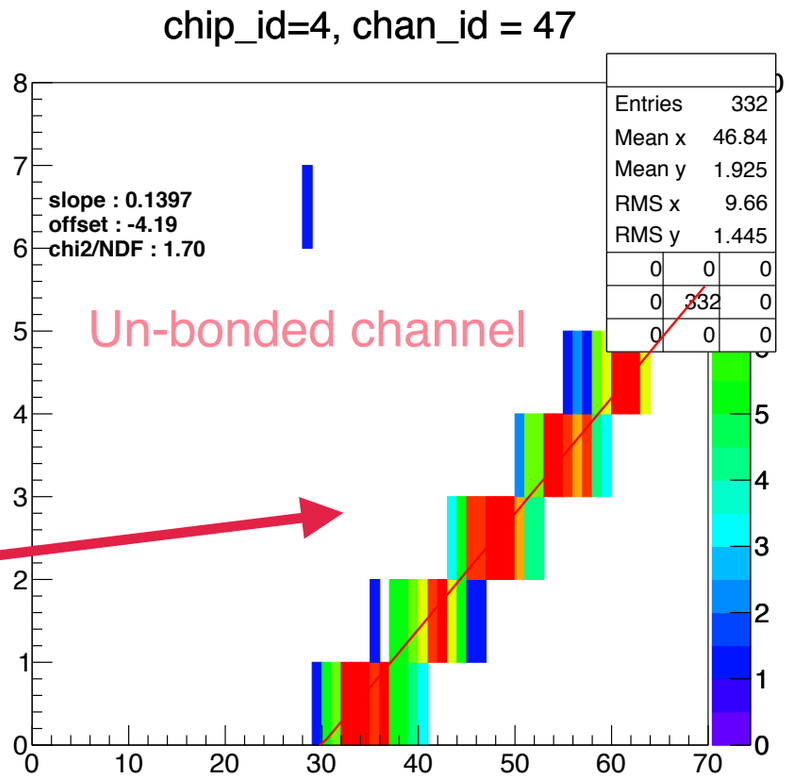
Source test preparation

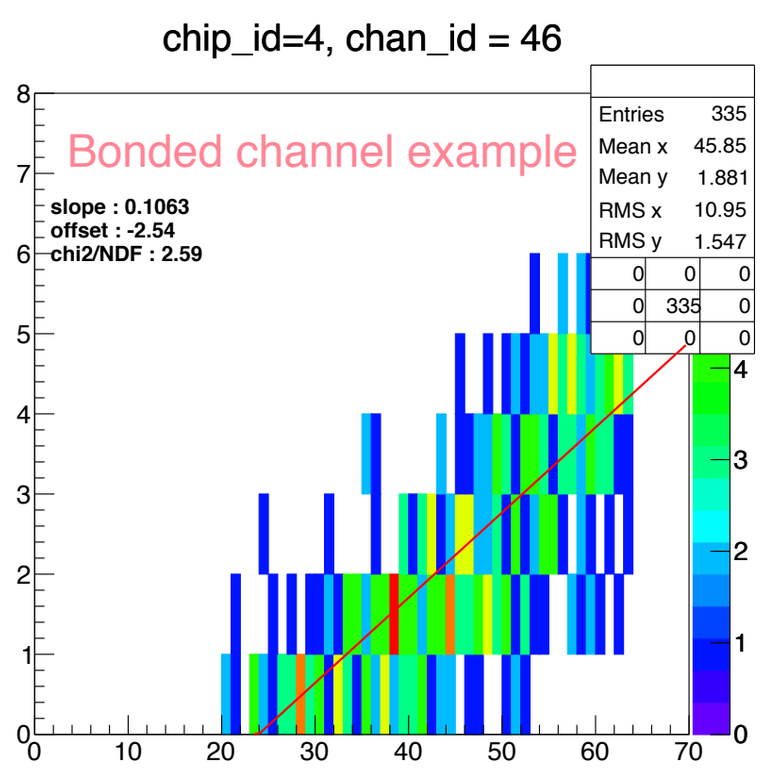
- One of feasible solution, set up another Testbench system in radiation-available room without “FEM-IB” :
  - FEM :
    - 3 FEM boards have been tested, all are functional.
  - ROC :
    - 2 ROC boards have been tested, one is functional.
    - The condition of bad ROC :
      1. The chip current is consistent before & after clicking “init”.
      2. No test pulse is generated.

Channel classification update

- The Un-bonded channel should be considered as bad channel, it can be checked by running calibration test without bias voltage.
- One un-bonded channel was found in BNL ladder (PPB2-L2N)
  File : fphx_raw_20210212-0942_0.dat



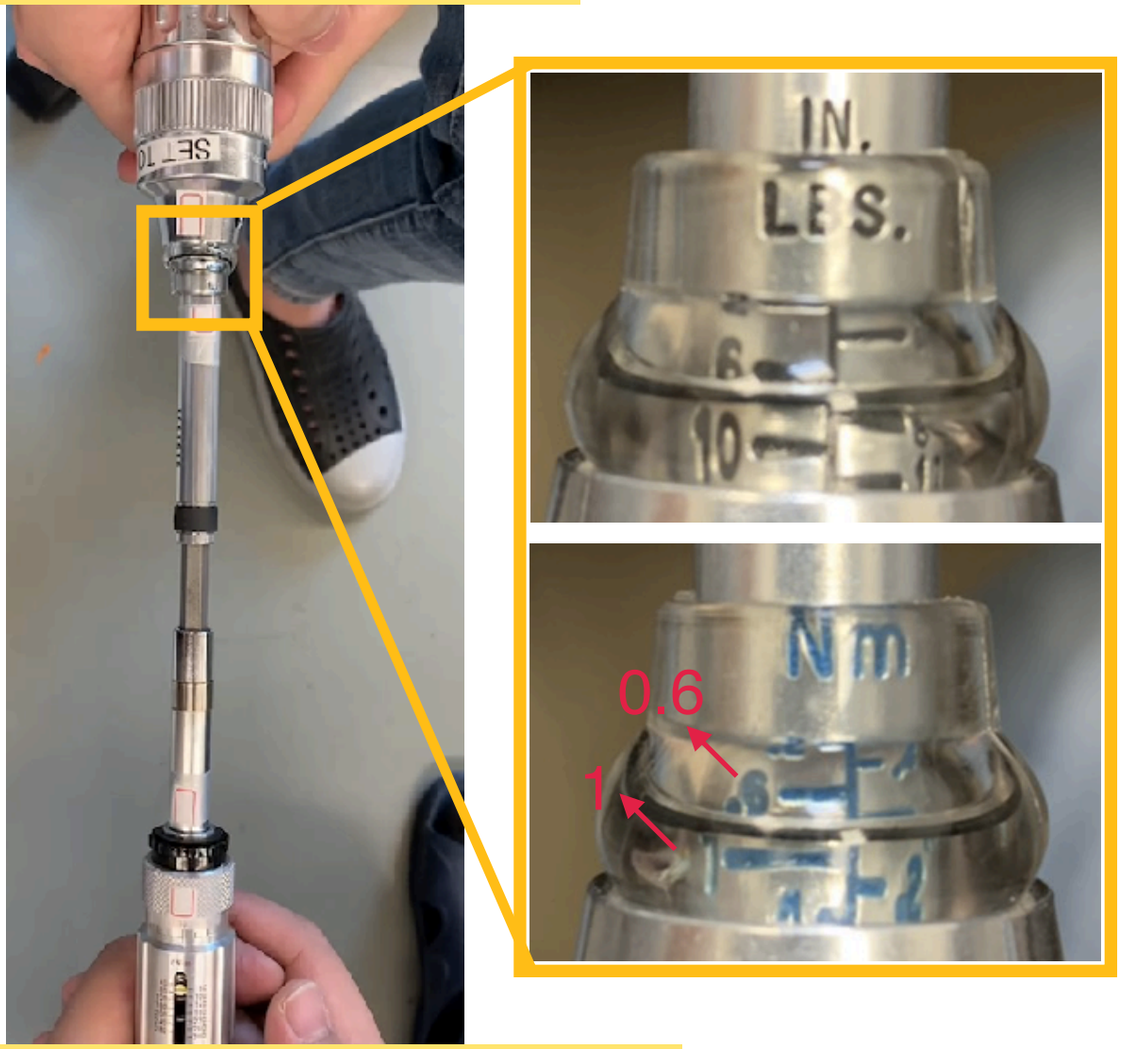




Ladder assembly : twist test

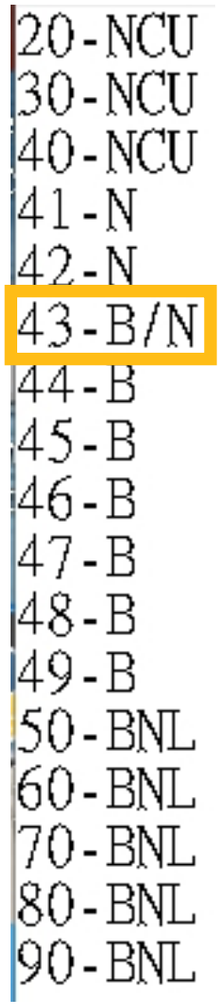
- We did the torque competition with 2 torque screw drivers.

BNL screw driver : set at 80cN*m



NTU screw driver set at different torque

NTU setting torque(cN) who is rotated

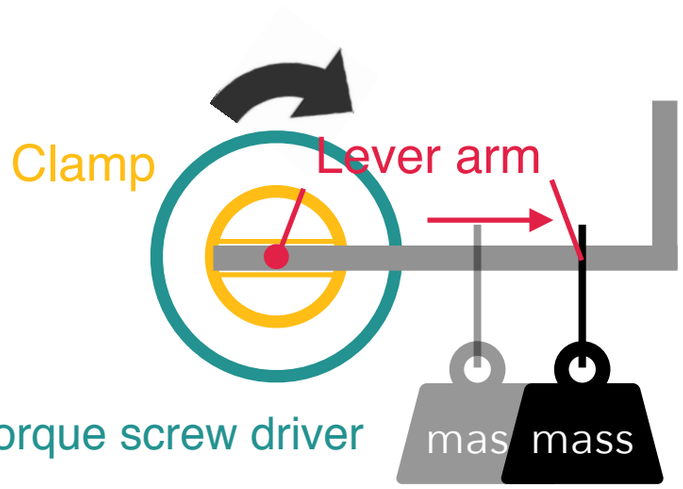


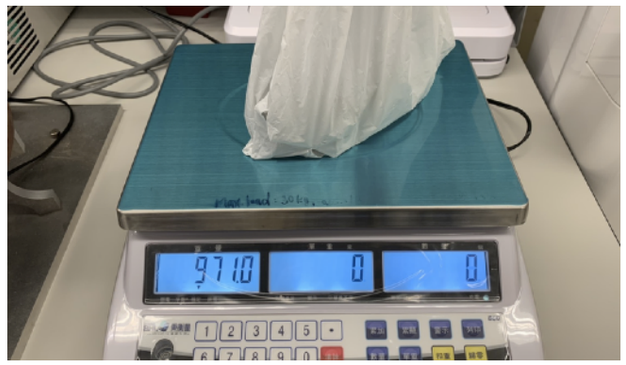
BNL 80 cN*m ~ NTU 43cN*m

Video link of this test

Ladder assembly : twist test

- We want to figure out what is the actual torque of 2 torque screw drivers whose setting value are both at 80 cN*m.





Torque (N*m): 0.971kg* 9.8N/kg* lever arm(m)

- The weight of mass is fixed.
- The mass is moved outward to increase the torque time by time, until the driver can't handle it.
- The video link of the test

- Maximum distance of lever arm :
  - BNL ~ 4 cm
  - NCU ~ 7cm
- Actual torque at 80cN*m setting value
  - BNL ~ 0.38 N*m
  - NCU ~ 0.7 N*m

Ladder assembly : twist test

- One NTU torque screw driver was sent to company for torque calibration.

Torque setting value　　Testing value

Nm

扳手最大扭力值的% / 數值	需量測的扭力值	1	2	3
20 % / 40		0.3938	0.3930	0.3936
40 % /				
60 % / 150		1.5131	1.5020	1.5025
80 % /				
100 % / 300		2.9688	2.9701	2.9745

BNL screw driver　　NTU calibrated screw driver

Result :

BNL 80 ≅ NTU 45

Summary

- If the cosmic test is performed with BEC, some chips seem to have only half of events.

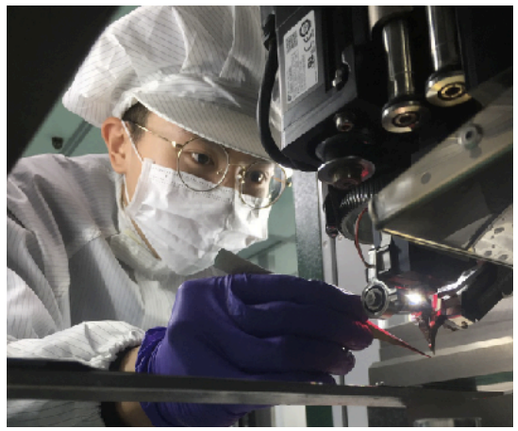
- Channel classification update :
  - The un-bonded channel should be considered as bad channel (high priority issue).

- The actual torque of BNL torque at 80 cN*m setting value is only 45 cN*m.

- To do :
  - Source test preparation : second Testbench in Taiwan.
  - Cosmic test with 2 modules.
  - Ladder assembly

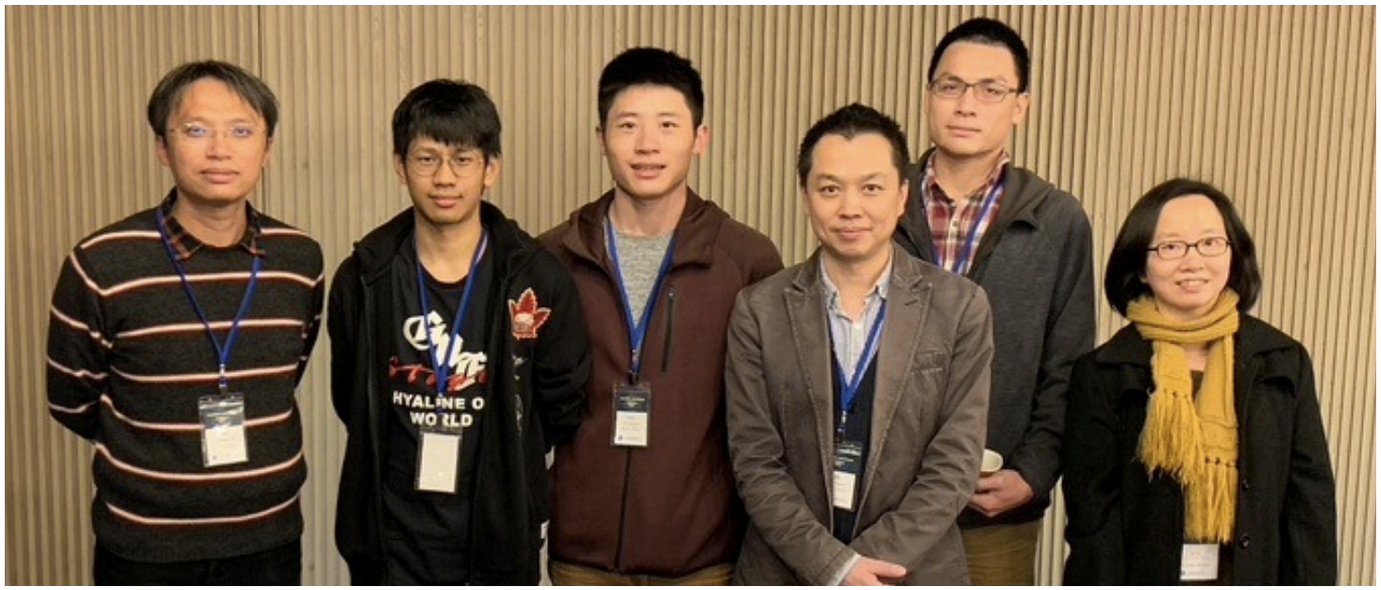
Back up

Taiwan INTT team



Ou-Wei Cheng

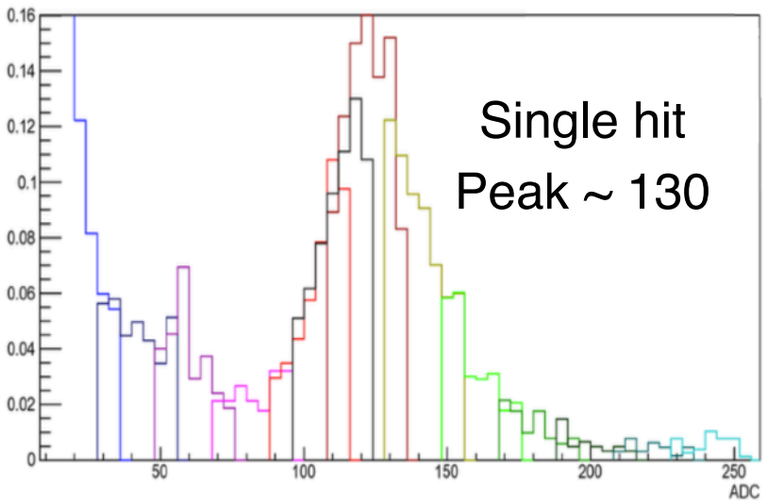
Kai-Yu Cheng



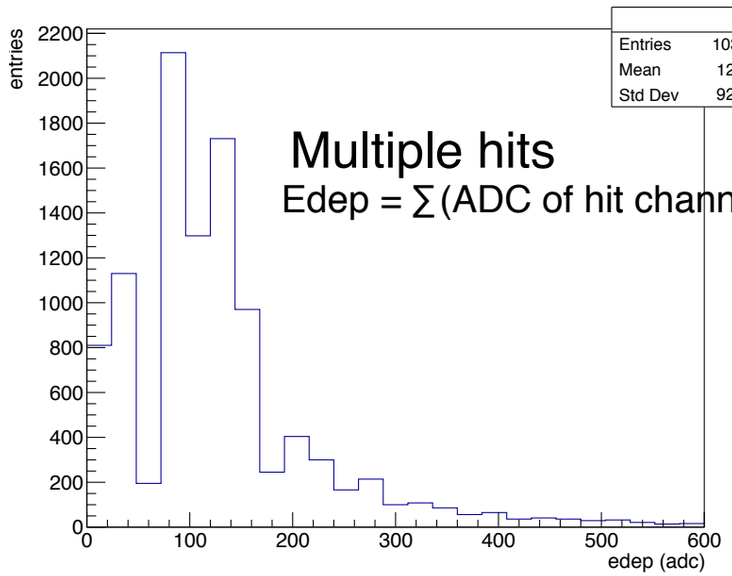
Chia-Ming Kuo Cheng-Wei Shih Lian-Sheng Tsai
Wei-Che Tang Rong-Shyang Lu Jenny Huang

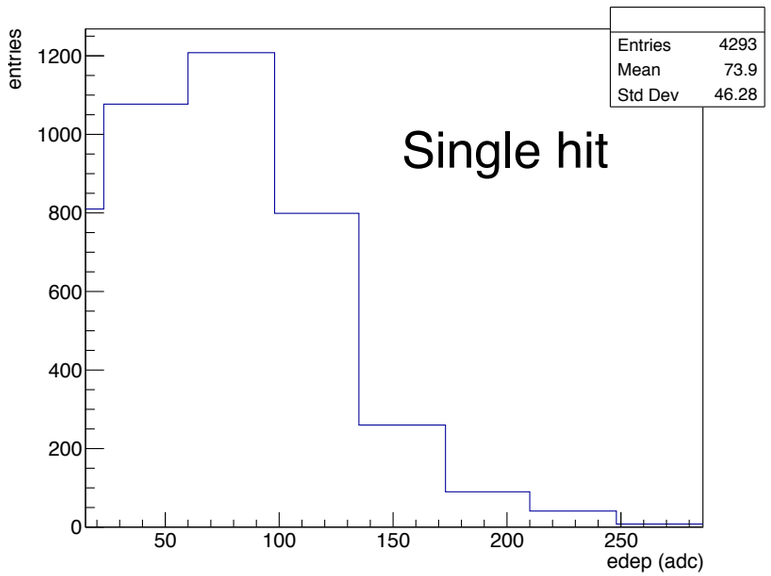
Cosmic test : Preliminary data checking

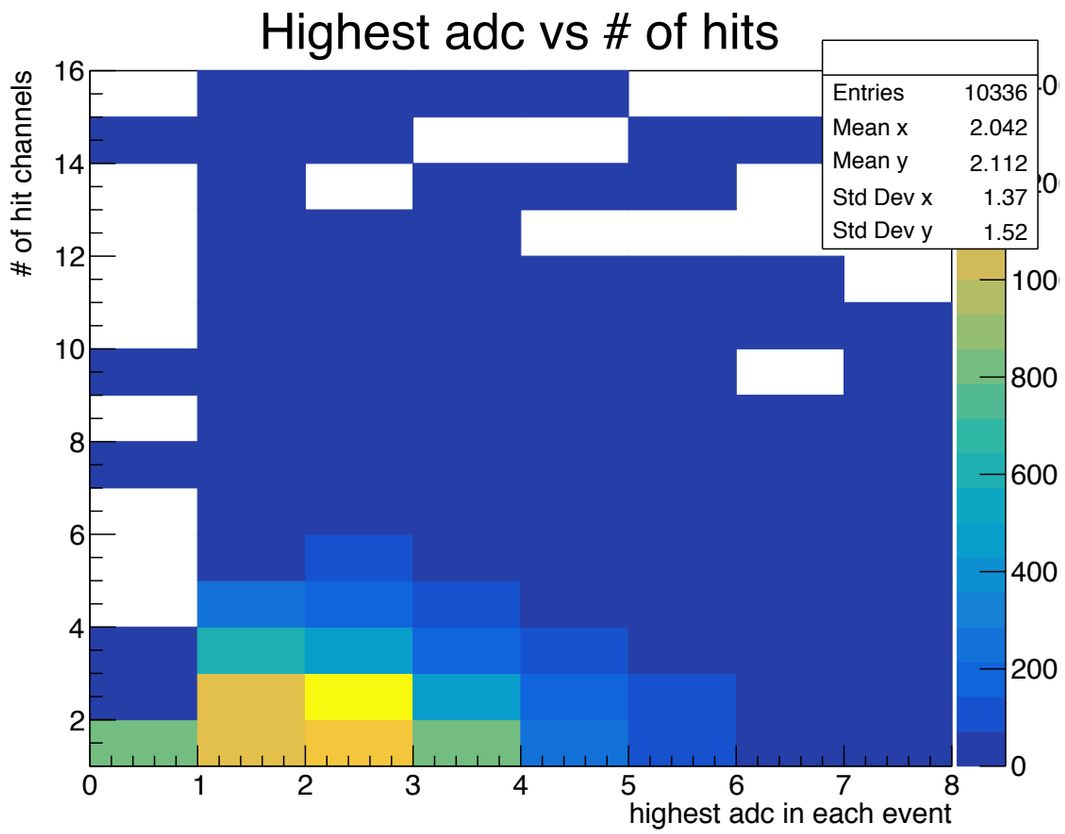
DAC Scan result from last TestBeam



Result from cosmic test







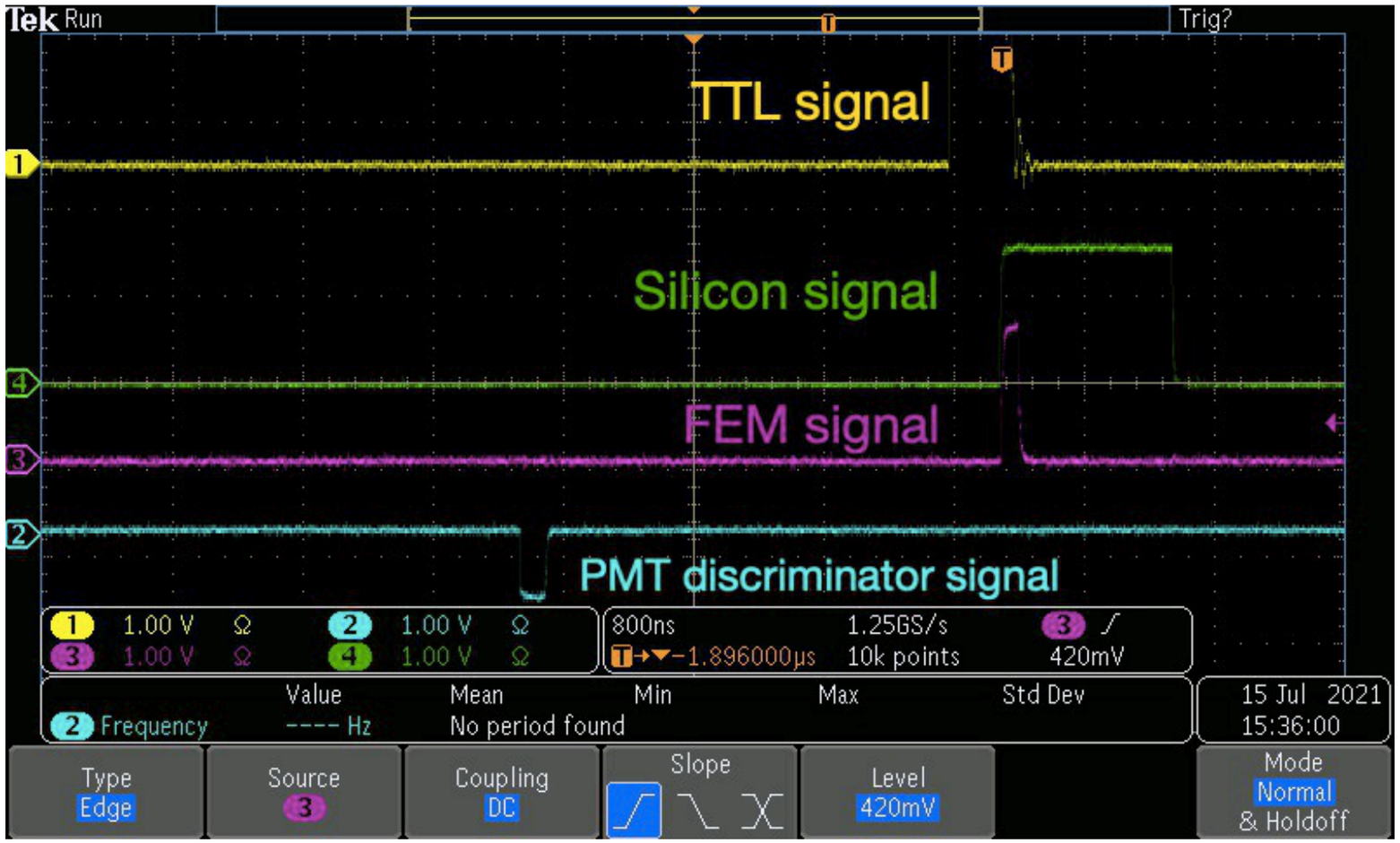
chip_id	chan_id	adc	bco	bco_full
13	84	1	62	19646
13	85	2	62	19646
13	86	2	62	19646
13	87	1	62	19646

Highest adc of this event : 2

Cosmic test

- The signals were checked by oscilloscope.

TTL signal : final signal from NI modules.
Silicon signal : the signal from half-ladder
FEM signal : coincidence signal of TTL signal and FEM signal.
Discriminator signal : if PMT signal > threshold



The signal seemed to be good

Conversion of DAC & mV

表 3.2　DAC 閾値設定

DAC	DAC 設定値	対応電圧 [mV]
DAC0	15	270mV
DAC1	23	300mV
DAC2	60	450mV
DAC3	98	600mV
DAC4	135	750mV
DAC5	173	900mV
DAC6	210	1050mV
DAC7	248	1200mV